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ABSTRACT

Activities in the ecology of New England's tidepools are provided in this field trip guide for elementary school teachers. Resources, curriculum materials, and services are identified that are available through the New England Aquarium's Department of Education. This packet contains: (1) pre-trip activities (offering a vocabulary list, illustrations, and coloring sheets of tidepool animals and seaweeds); (2) trip activities (including trip guidelines, a floor plan of the aquarium, and a lab exercise on animal behavior); and (3) post-trip activities (suggesting projects and activity options for home and classroom use). Resource publications for students and teachers are also provided. (ML)

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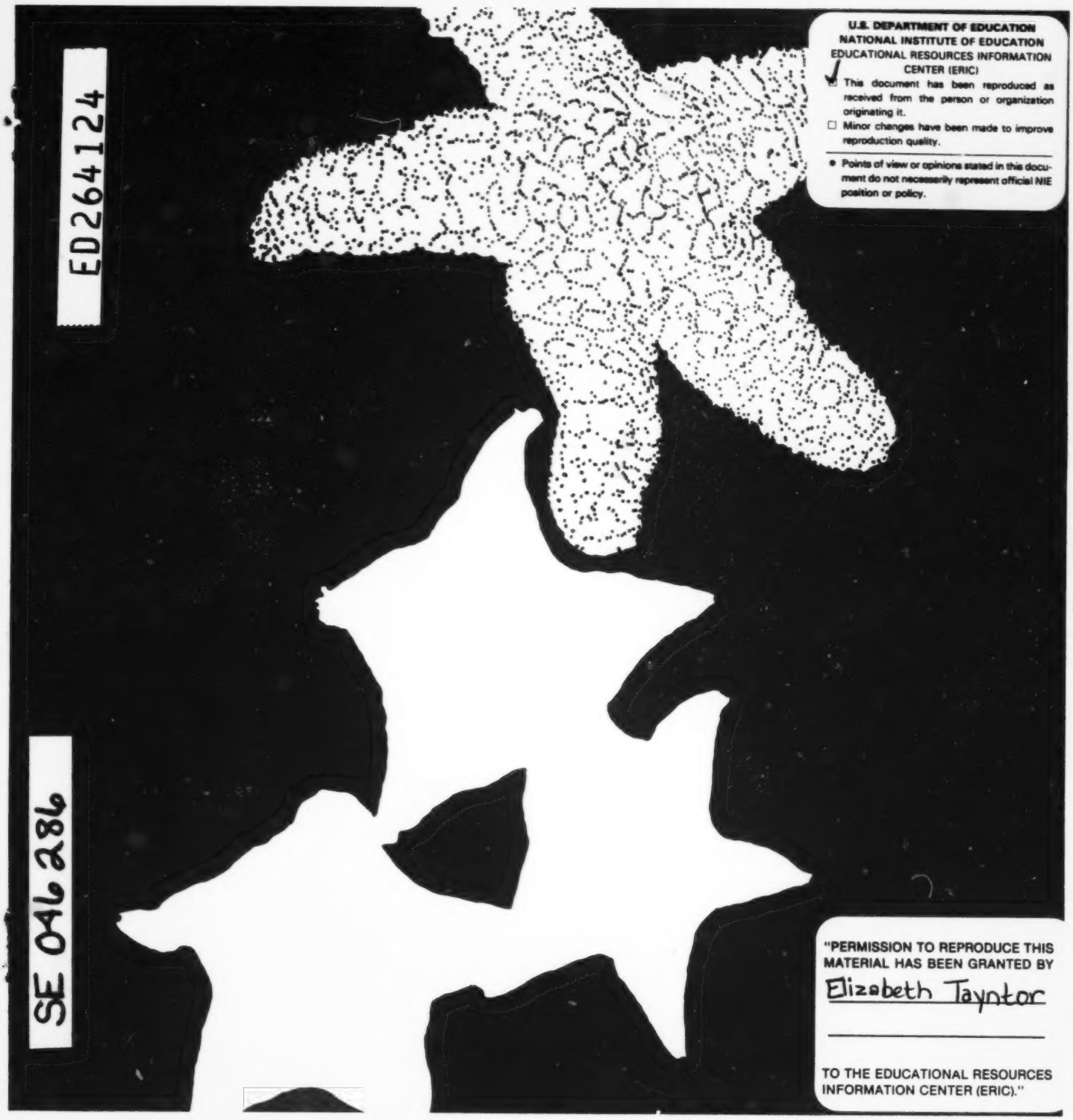
Life on Rocky Shores

Grades K-6



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for teachers

Sea stars, rock crabs, sea urchins and periwinkles are just some of the animals that live in New England's seaweed jungles. You and your students may study these tidepool inhabitants at the New England Aquarium. This packet is designed to help you prepare your students for a visit, have a successful field trip, and extend the learning process afterwards with follow-up activities for the classroom.

In this packet you will find:

- information for teachers
- classroom activities and topics for discussion to be used before your trip
- a floor plan of the building and helpful hints for planning a field trip
- field trip activities and worksheets
- follow-up activities for the classroom
- a bibliography

All of these materials may be copied for educational purposes. Please feel free to share fact sheets, worksheets, and program information with your students and other teachers.

An evaluation form is enclosed for your comments and we want to hear from you! Please tell us if educational materials like these meet your needs and/or how we can work to improve our services for educators.

If you have any questions about this curriculum, or other Education Department offerings, please feel free to call or write to us for more information.

Enjoy your visit,

Liz Tayntor

Liz Tayntor
Assistant Curator,
Education

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teacher resources

CURRICULUM PACKETS:	These contain fact sheets, worksheets, and field trip activities. Request one for FREE when you make a reservation to visit. Additional copies are $3.
PRE-VISIT PASSES:	Teachers may visit the Aquarium FREE of charge to view our changing exhibits and plan field trip activities. Request your pre-visit pass from the Education Office.
EDUCATIONAL PROGRAMS:	See a Dolphin and Sea Lion Show and one of our Educational Programs when you visit. Programs are FREE. Advance reservations are required. Seating capacity is limited.
TEACHER WORKSHOPS:	Sharpen your knowledge of Aquarium animals and aquatic environments at a teacher workshop. Thursday afternoons, 4-6pm. once per month. Fees vary. For a complete schedule of topics, call the Education Office.
TRAVELING SLIDES:	Prepare students for a visit to the New England Aquarium with slides and a script that highlight many aquatic animals and habitats. Slide sets are loaned, as available, to groups with a field-trip reservation. A postage fee is required.
ANIMALS ON THE ROAD:	Combine a live animal program in the classroom with an Aquarium field trip for a mini-course on ocean life. Prices begin at $65 and vary depending on group size. Call the Education Office for a complete list of outreach offerings.
WHALE WATCH:	Take your students on an adventure to see whales in their natural habitat. For special group rates, call the Sales Office.
MASSACHUSETTS SCHOOLS:	Thanks to the generous support of the Mass Department of Education, all Mass students visting in organized groups are now FREE at the New England Aquarium. RESERVATIONS ARE REQUIRED. For more information call the Sales Office.
FOR MORE INFORMATION:	Call the Education Department, (617)-742-8830, or write c/o School Resources Coordinator.

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curriculum materials

To help you plan a field trip to the New England Aquarium, the Education Department has developed a series of curriculum packets. These units focus on popular Aquarium exhibits and important aquatic themes. Daily educational offerings support curriculum materials.

Curriculum packets include: 1) information to prepare your students for a visit to the New England Aquarium, 2) hints for planning a successful field trip, and 3) follow-up activities for the classroom.

Aquarium Exploration Kit, grades K-2	_____	$3.00 each
Tidepools: Edge of the Sea, grades K-6	_____	$3.00 each
Tidepool Information Sheets, grades 2-8 (set of eight fact sheets with illustrations for classroom study)	_____	$1.50 per set (10 or more, $1 per set)
Sharks, grades 3-6	_____	$3.00 each
Seals, grades 3-6	_____	$3.00 each
Aquarium Resource Kit, grades 6-8	_____	$3.00 each
Fish: Form and Function, grades 6-12	_____	$3.00 each
Inside the Giant Ocean Tank, grades 6-12	_____	$3.00 each
Whales of New England, grades 6-12 (whale watch curriculum)	_____	$3.00 each
Self-guided Tour of the Aquarium, high schools and universities (includes Teacher's Guide)	_____	$3.00 each
	_____	TOTAL

To order curriculum, send your name, address and name of school to:

New England Aquarium
Central Wharf
Boston, MA 02110
Attn: Education/Curriculum

Please include payment with your order. All checks should be made payable to the New England Aquarium. Please allow two weeks for delivery.

For more information on this and other Education Department programs, please call (617) 742-8830, or write to us.

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1

pre-trip activities

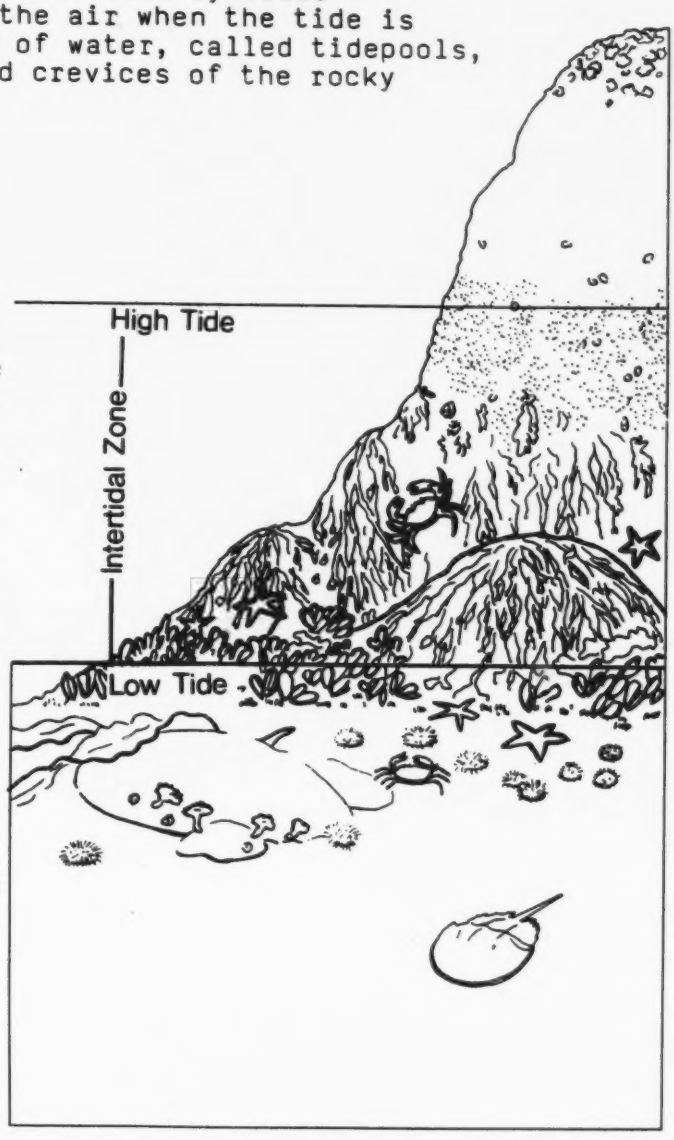
tidepools

What is a tidepool?

Along the rocky shores of New England the tide rises and falls twice each day, creating a strip of land known as the intertidal zone. This zone is covered by water during high tide and exposed to the air when the tide is low. As the tide recedes, pools of water, called tidepools, are left behind in the cracks and crevices of the rocky shore.

What lives in a tidepool?

Most of the animals found in a tidepool are invertebrates - animals without backbones. These animals include sea stars, sea urchins, crabs, sea anemones periwinkles, and mussels. Tidepools are also filled with a variety of seaweeds such as sea lettuce, rockweed, and Irish moss. The plants and animals that live in tidepools are well adapted to the harsh conditions of this environment. They must be able to withstand the drying effects of low tide, crashing waves, and rapid changes in temperature and salinity.



Animals and plants live in different areas of the rocky shore according to their needs. Animals that must always be wet, like sea anemones and sea urchins live below the low tide mark. Others, like the periwinkles and mussels, hold water in their shells and can live in areas uncovered at low tide. Crabs and sea stars move to follow the tide or hide among seaweeds and under rocks to stay wet.

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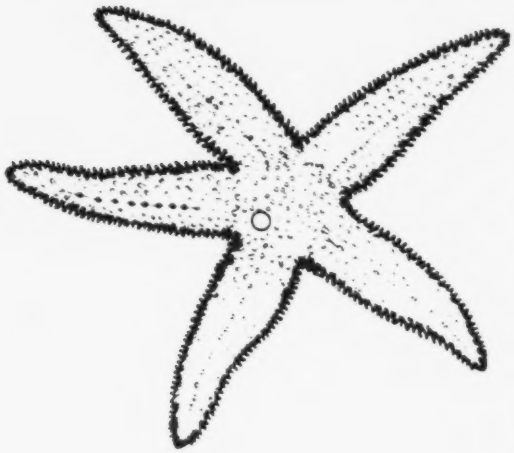
tidepool animals 1

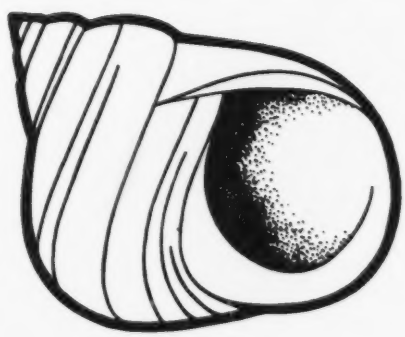


SEA STAR

Though sea stars are sometimes called starfish, they are not fish at all. They belong to a special group of ocean animals called "echinoderms," or animals with spiny skins. Sea stars have five eyes, one at the end of each arm, to detect light. Along the under-side of a sea star are hundreds of flexible feet, called tubefeet. Each of these tubefeet has a suction cup on the end for crawling and holding on. These feet are also used to pull apart the shells of mussels and clams which the sea stars like to eat.

MUSSELS

Mussels, like their relatives the clams, have soft bodies protected by two hard shells. At high tide, mussels slightly open their shells to feed. They eat tiny plants and animals called plankton. At low tide their blue-black shells close tightly, trapping water inside to protect the mussel from drying out.



PERIWINKLES

Periwinkles are small snails with lots of holding power. They have a strong muscular foot that attaches firmly to rocks and seaweeds. The periwinkle extends its fleshy foot to crawl, but it never comes completely out of its shell. A periwinkle is permanently attached to its portable home. A perwinkle's tongue is covered with small teeth. Its sandpaper-like surface is just right for scraping algae off rocks for the periwinkle to eat.

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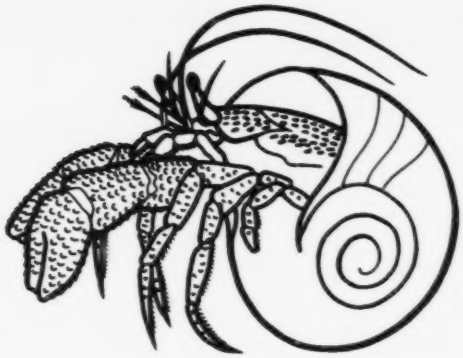
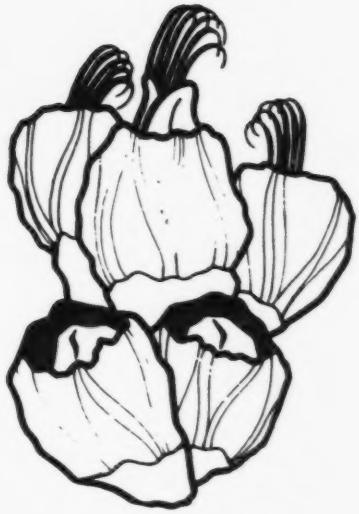
tidepool animals 2



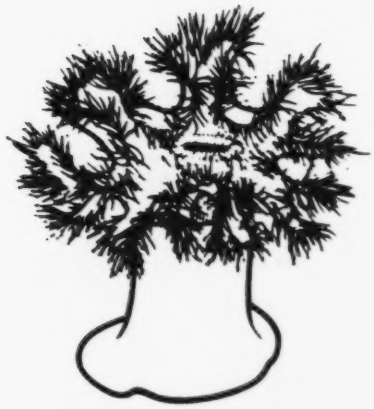
HERMIT CRAB

While most crabs grow their own hard shells for protection, the hermit crab borrows one. This crab lives inside an empty snail shell. When threatened, it pulls its soft body completely inside the shell for protection. As the hermit crab outgrows its borrowed home, it searches for a larger shell to move into.



BARNACLES

Barnacles are found high on the rocks at the edge of tidepools. They have hard rock-like skeletons that protect them from enemies. When the tide is low, barnacles close their skeletons to protect themselves from drying out. At high tide, they open their shells to feed on plankton. Barnacles use their feathery legs to capture the tiny plants and animals.



SEA ANEMONE

Sea anemones may look like undersea flowers, but don't let them fool you. They are animals and, like their relatives the jellyfish, sea anemones can sting! An anemone's mouth is surrounded by tentacles. Each of the tentacles has special cells for stinging and capturing tiny animals called zooplankton. When a tiny animal touches the anemone's tentacles it is trapped by sticky threads and pulled down into the anemone's stomach. Can New England sea anemones sting people? No, our skin is too thick.

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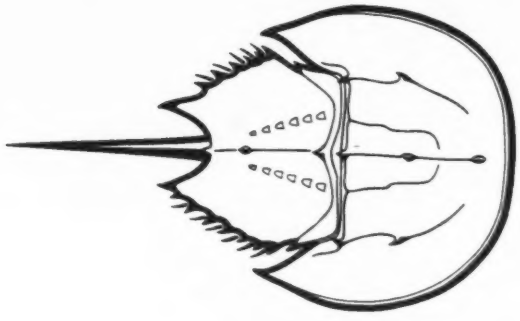
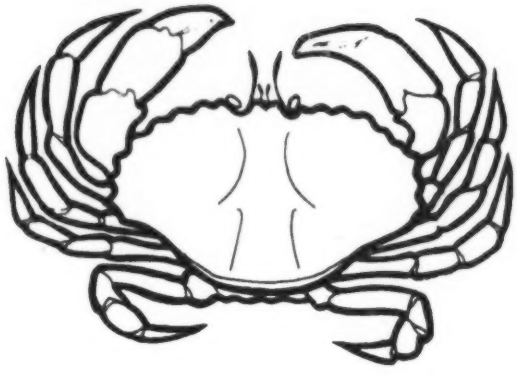


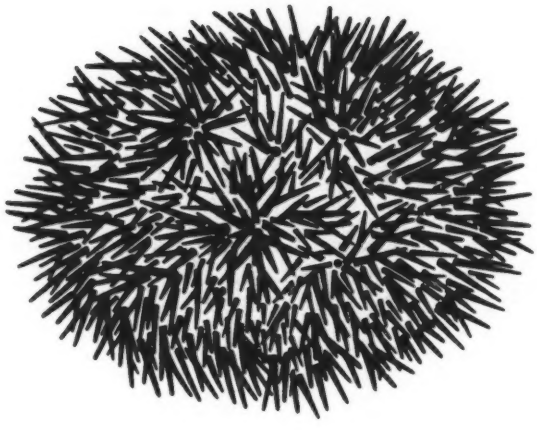
HORSESHOE CRAB

Horseshoe crabs look frightening, but they cannot hurt you. Their long pointed tail is not a weapon or a stinger. The animal uses it to right itself when flipped on its back. The hard armor-like shell is for protection. Horseshoe crabs usually feed on worms, young clams, or dead animals. Sometimes you may see these crabs on a beach in the springtime when they come on shore to breed.



ROCK CRAB

The rock crab has four pairs of legs for walking, a pair of claws for feeding and self-defense, and a hard shell for protection. The rock crab does not have a bone in its body. Its skeleton is its shell. As the crab grows, its shell becomes too small and it must molt, or shed its shell. Underneath the old shell a new shell has already begun to grow. After molting, the crab hides for a few days until this new shell is hard. Crabs are scavengers. They will eat dead animals, live worms, and even other crabs!



GREEN SEA URCHIN

A sea urchin has a hard, round skeleton covered with spines for protection. Between the spines are slender feet called tubefeet. Each tubefoot has a suction disk on the end for crawling and holding on. The sea urchin's mouth is located on its underside in the middle of its body. The sea urchin uses the five teeth in its mouth to chew on seaweeds and scrape algae off the rocks for food.

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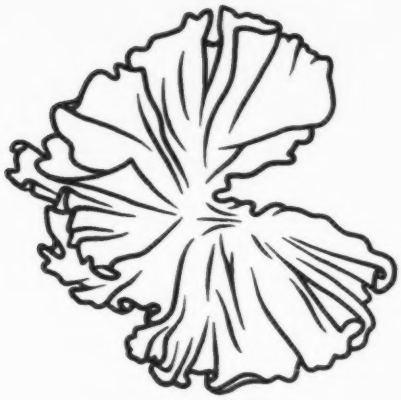
seaweeds



There are many types of seaweeds. Some are green, others are red or brown. In the tidepool, seaweeds provide food or hiding places for many small animals.

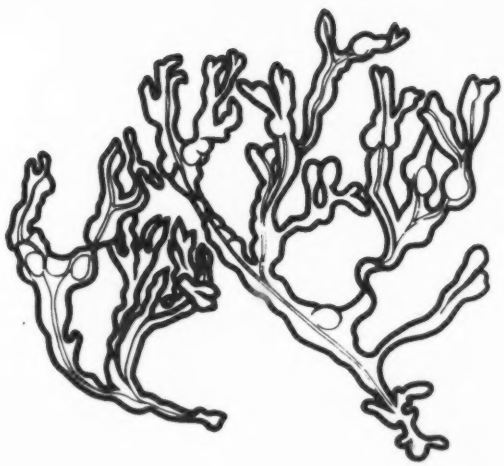
SEA LETTUCE

This flat green seaweed is almost transparent. In the Orient, sea lettuce is used to make soup. In Scotland, it is used for salads.

IRISH MOSS

Although you might expect Irish moss to be green, it is a deep red color. Sometimes there is so much Irish moss in one place that it looks like a thick red carpet. Many people use this seaweed to make a pudding called "blancmange." If you would like to try "blancmange," here is the recipe:

Soak 1 cup Irish moss seaweed for a few minutes in water. Clean and drain. Cook 4 cups of milk and seaweed in a double boiler for 20 minutes, stirring all the time. Add 1/2 cup sugar, 1/2 tsp. salt, and 1 tsp. vanilla. Cook 5 minutes. Strain to remove pieces of seaweed. Chill and serve.



ROCKWEED

As its name suggests, this brown seaweed holds on tightly to rocks. The bubbles, or air bladders, in its blades work like life preservers to keep them afloat during high tide. During low tide, crabs and sea stars may be found hiding under bunches of rockweed, keeping wet until the tide returns.

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vocabulary

ALGAE	Simple plants, often called seaweeds, that live in the ocean.
CRUSTACEAN	A group of animals with a hard outer skeleton and 10 jointed legs. Crabs, lobsters and barnacles are crustaceans.
ECHINODERM	A special group of ocean animals with "spiny skin". Sea stars, sea urchins, and sea cucumbers are echinoderms.
HABITAT	The place where an animal or plant lives.
INVERTEBRATE	An animal with no backbone.
MOLLUSK	A group of animals with soft bodies, usually protected by a shell. Clams, mussels, and octopi are mollusks.
PLANKTON	Free-floating animals and plants that provide food for many tidepool animals.
TIDEPOOL	A pool of water, formed at low tide, between the cracks and crevices of a rocky shore.
SCAVENGER	An animal that feeds on dead animals. Crabs are scavengers.
SIEVE PLATE	The round plate on the top of a sea star that filters water entering the animal's body. This water travels through canals to the sea star's feet, allowing the animal to move.
TUBEFEET	Soft, flexible feet with suction disks at the ends, used by echinoderms for locomotion.
VERTEBRATE	An animal with a backbone.

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worksheet: tidepool animals

Name: _____ Date: _____

ANIMAL NAMES	HOW DO THEY MOVE?	WHAT DO THEY EAT?	WHAT EATS THEM?	HOW DO THEY PROTECT THEMSELVES?
Sea star				
Sea urchin				
Rock crab				
Periwinkle				
Horseshoe crab				

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worksheet: tidepool animals

answers

ANIMAL NAMES	HOW DO THEY MOVE?	WHAT DO THEY EAT?	WHAT EATS THEM?	HOW DO THEY PROTECT THEMSELVES?
Sea star	crawls with hundreds of tube feet	clams scallops mussels	crabs fish	tough, spiny skin
Sea urchin	walks with long, slender tube feet and spines	sea lettuce and other algae	crabs gulls fish people	spines
Rock crab	walks side-ways and backwards on jointed legs	dead animals live worms crabs	gulls fish crabs people	hard shell; claws
Periwinkle	crawls with strong, muscular foot	rockweeds and other algae	dog whelk fish crabs people	pulls into hard shell
Horshoe crab	walks on jointed legs	sea worms small clams dead animals	sharks gulls	hard shell

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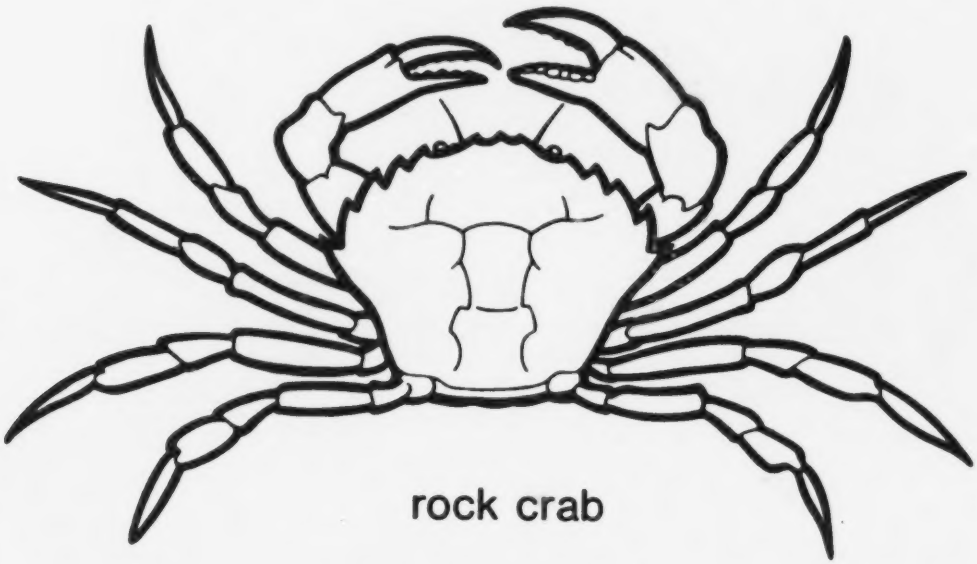
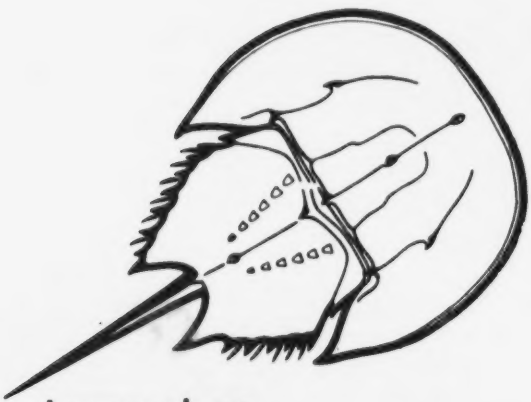
coloring sheet

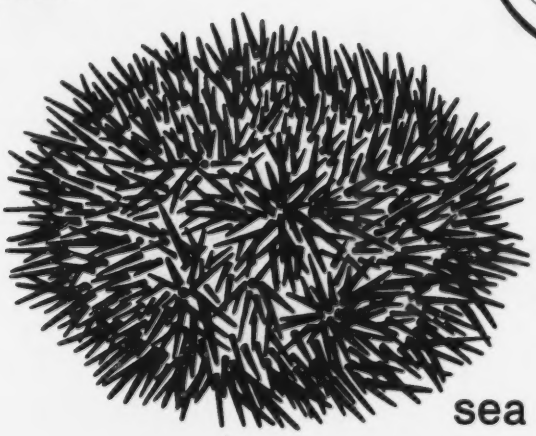


rock crab



horseshoe crab

hermit crab



sea urchin

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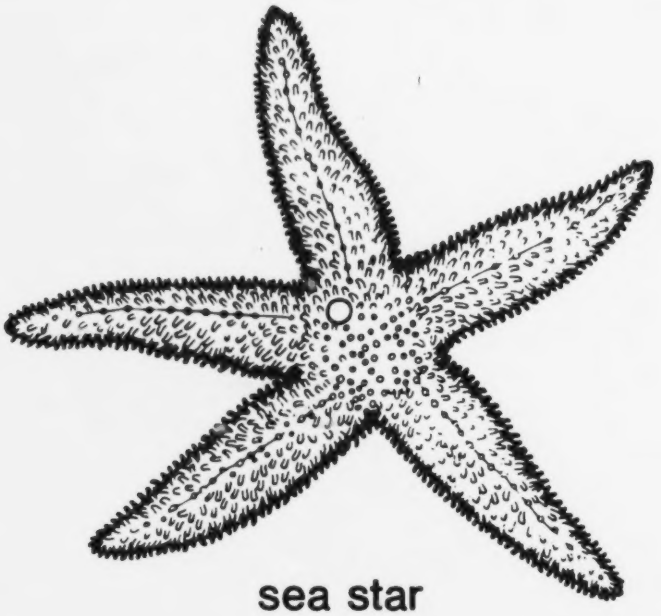
coloring sheet

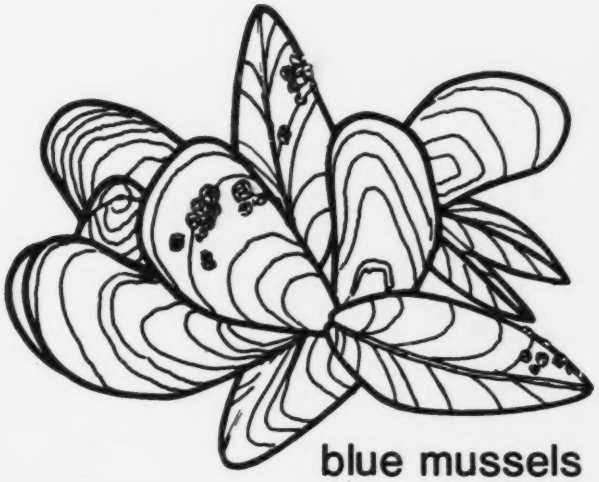
sea anemone



sea star

periwinkle

barnacles



blue mussels

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2

trip activities

for teachers

A unique look at "the world of water" awaits your students when they visit the New England Aquarium. To help your trip run smoothly, keep in mind the following:

- Be sure your students are adequately supervised. One chaperone is admitted FREE for every 10 students.
- Remember the Aquarium's exhibit galleries are dimly lit, giving the illusion of entering an underwater world. The exhibit tanks themselves are well-lit.
- Students will receive handstamps as they enter. These will allow them to attend the dolphin and sea lion show, and re-enter the main building.
- School programs take place in the auditorium on the first level of the building. Your group will be paged to the auditorium 10 minutes before the show is scheduled to begin. Please arrive on time. ADVANCE RESERVATIONS ARE REQUIRED.
- The dolphin and sea lion show is held on the ship DISCOVERY. To get to the DISCOVERY, you must exit thru the front doors of the main building. Doors open 15 minutes before show-time.

The "Edge of the Sea"/Children's Tidepool exhibit is on the third level of the building. Here students will have the opportunity to pick up live seashore animals. Aquarium staff will be available to answer questions. Please remind students that live animals must be handled with care.

- Aquarium volunteers, wearing blue smocks, are available throughout the building to answer your questions and talk with your students.
- If possible, try to schedule your visit during the FALL or WINTER months. Springtime is the school field trip season and your students may be sharing the exhibit areas with many other children during this time. The extra noise and confusion may make learning more difficult for your group.
- And finally, it is important to remember that a trip to the Aquarium can be a very exciting adventure in itself - and it is often easy to over-stimulate and tire children in the galleries. Try not to overload your visit. Instead, spend time at one or two galleries or exhibits, or have students focus on just a few of the animals.

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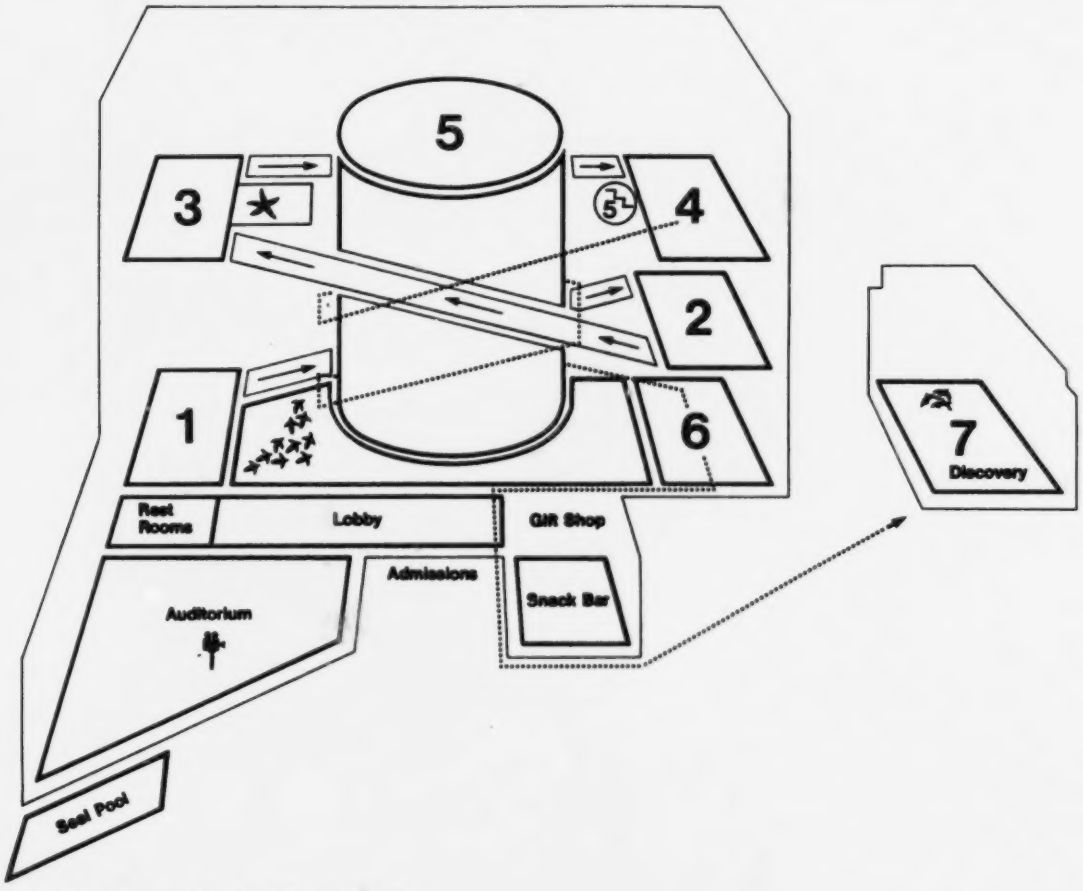

1 Special Exhibit
2 Temperate Marine Gallery
3 Freshwater "Edge of the Sea" / Tidepool
4 Northern Waters of the World / Harrington Gallery
5 Top of the Giant Ocean Tank / (5) Stairs
6 Tropical Marine Gallery
7 Discovery / Marine Mammal Show

NOTE:
To all the exhibits in the main building follow a one-way route along straight ramps to the top of the building and descend to the first floor along the spiral ramp of the Giant Ocean Tank.

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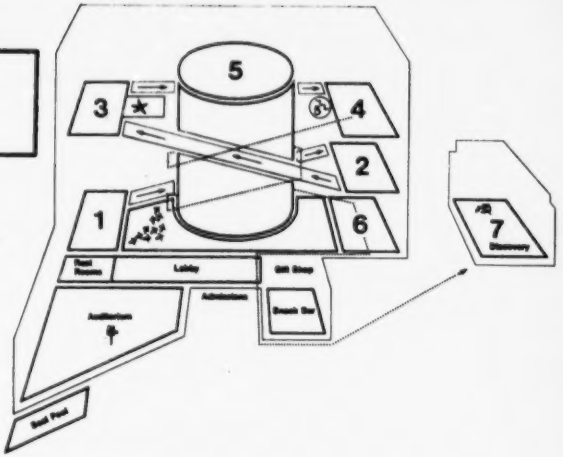
New England Aquarium

Use this floor plan to locate specific exhibits on each gallery. ⟶



Labels above the exhibit tanks identify the animals and plants within each display.

2 Temperate Marine Gallery

Blue Hole	Coloration	Fish Shapes	Boston Harbor Past & Present	Charles River Basin	Mariculture	Mediterranean Fishes	Schooling	Saltmarsh	Mangrove Swamp

3 Freshwater Gallery

Electric Eel	Trout Stream	Rift Lake Cichlids	Amazon River Community	Freshwater Pond	South American Exotics	Asian Fishes	Primitive Fishes	Piranha	Atlantic Salmon	Rheotaxis

4 Northern Waters of the World / Harrington Gallery

Harborview Room	West Coast Tidepool	Gloucester Breakwater	Georges Bank	Isles Of Shoals	Eastport Harbor	Giant Lobster	Deep - Sea Dwellers	Bottom Dwellers	Octopus	Pacific Northwest

6 Tropical Marine Gallery

Otters	Flashlight Fishes	Animal Partners	Living Coral Reef	Twilight Dwellers	Pacific Coral Reef	Spiny Lobsters	Armored Fishes	Tropical Atlantic Fishes	Pacific Reef

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lab exercise: animal behavior

Biologists attempt to describe the behavior of animals in an effort to understand how they live. In this exercise you will spend a certain amount of time observing live animals to determine aspects of their behavior.

Choose an animal and observe it closely for 5 minutes. Record the following information:

Common name: _____

Scientific name: _____

Natural habitat: _____

Color(s): _____

Approximate size: _____

sketch

Unusual features: _____

_____

Special adaptations for finding food:

_____

Special adaptations for defense:

_____

Describe the animal's movements, interactions with tank mates, and other behaviors:

_____

_____

_____

_____

_____

_____

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my aquarium sketch

name of aquarium exhibit _____
animals & plants _____

name of artist: _____

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3

post-trip activities

activities

DISCUSSION:	Encourage students to think about and answer these questions about tidepool animals: How do these animals move? How do you think they might feel to touch? What might they eat? How do they protect themselves?
ART PROJECTS:	Make a diorama illustrating a tidepool scene. Place plants and animals in the habitats where they would be found (on the rocks, deep in the tidepool, on a sandy beach, etc.).
RESEARCH:	Have each student study one tidepool animal or plant and write a report or give a presentation to the class.
TIDEPOOL TIMES:	Develop a newspaper. Write articles about tidepool animals or a tidepool field trip. Include imaginary interviews with tidepool animals; record special events like "The Big Storm". Illustrate with Aquarium sketches.
PICTURE CARDS:	Duplicate the picture sheets and mount the animals on sturdy cards. Play a variety of concentration games. Match the pictures or try to match animals with similar characteristics (animals that are the same color, live in the same part of the tidepool, eat the same food, etc.).
CURRENT EVENTS:	Cut out articles from newspapers and magazines that focus on fishing, the ocean, environmental issues. Suggest educational television programs to view. Keep a current events bulletin board.
CREATIVE WRITING:	Compose a short poem about tidepools, waves, plants, and animals. Try a haiku. Have students imagine they are an animal in a tidepool. Write short stories such as "A Day in the Life ...".
SEAFOOD SOUP:	Try cooking an ocean recipe. Instructions for seaweed pudding are included in this packet. Or visit a fish store to find squid, shark, or clams.

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tidepool word search

P	T	H	E	R	M	I	T	C	R	A	B	A	R
E	I	R	O	C	K	W	E	E	D	Q	L	N	M
R	D	O	S	E	A	U	R	C	H	I	N	E	U
I	E	F	E	L	S	C	A	L	L	O	P	M	S
W	P	B	A	R	N	A	C	L	E	V	U	O	S
I	O	W	S	M	U	Z	R	G	F	A	H	N	E
N	O	H	T	K	Q	L	A	J	I	B	S	E	L
K	L	N	A	P	B	S	B	P	S	O	P	K	S
L	X	E	R	O	H	F	L	N	H	K	O	J	L
E	M	I	S	V	R	D	T	W	X	E	N	I	M
S	E	A	C	U	C	U	M	B	E	R	G	B	D
L	Z	A	R	Y	D	L	O	B	S	T	E	R	A

Find and circle the words that are hidden in the puzzle.
All the words read from top to bottom or left to right.
You should find 15 words.

1. Perwinkle
2. Fish
3. Mussel
4. Scallop
5. Sea urchin
6. Sea star
7. Barnacle
8. Sea cucumber
9. Rockweed
10. Anemone
11. Sponge
12. Lobster
13. Crab
14. Tidepool
15. Hermit crab

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bibliography 1

For Children:

Adrian, Mary, A Day and a Night in a Tidepool, Hastings House, New York, 1972.

Dethier, Vincent, Newberry: The Life and Times of a Maine Clam, DownEast Books, Camden, Maine, 1981. Fiction.

Holling, Clancy, Pagoo, Houghton Mifflin Company, Boston, 1957. Fiction about a hermit crab and companions.

Jacobson, Morris K. and William K. Emerson, Wonders of Starfish, Dodd, Mead and Company, New York, 1977. All ages, adult.

Jacobson, Morris K. and William K. Emerson, Wonders of the World of Shells, Dodd, Mead and Company, New York, 1971. All ages, adult.

Johnson, Sylvia A., Crabs, Lerner Publications Company, Minneapolis, 1982.

List, Ilka Katherine, Questions and Answers about Seashore Life, Four Winds Press, New York, 1970. All ages, adult.

McClung, Robert M., Horseshoe Crab, William Morrow and Company, 1967.

Peet, Bill, Kermit the Hermit, Houghton Mifflin Company, Boston, 1967. Fiction about an anti-social crab.

Ross, Arnold and William K. Emerson, Wonders of Barnacles, Dodd, Mead and Company, New York, 1974. All ages, adult.

Zim, Herbert S. and Lester Ingle, Seashores, a Golden Nature Guide, Golden Press, New York, 1955. All ages.

For teachers:

Berrill, Michael and Deborah, A Sierra Club Naturalist's Guide to the North Atlantic Coast, Sierra Club Books, San Francisco, 1981.

Berrill, N.J. and Jacquelyn Berrill, 1001 Questions and Answers About the Seashore, Dover Publications, Inc., 1957.

Buchsbaum, Ralph, Animals Without Backbones, University of Chicago Press, Chicago, 1948.

Carson, Rachel, The Edge of the Sea, Houghton Mifflin Company, Boston, 1955.

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bibliography 2

Gosner, Kenneth L., A Field Guide to the Atlantic Seashore, Houghton Mifflin Company, Boston, 1979.

Hay, John, The Sandy Shore, The Chatham Press, Old Greenwich, Conn., 1970. All ages.

Kingsbury, John, The Rocky Shore, The Chatham Press, Old Greenwich, Conn., 1970. All ages.

Robbins, Sarah Fraser and Clarice Yentsch, The Sea is All About Us, Peabody Museum of Salem, Mass., 1973.

Spotte, Stephen, Marine Aquarium Keeping, John Wiley and Sons, New York, 1973.

Silverburg, Robert, The World Within the Tidepool, Weybright and Talley, New York, 1972. All ages.

Other Publications:

Current: The Journal of Marine Education, Publication of the National Marine Education Association. Free with membership; annual fee $15. NMEA, Box 666 Narragansett, RI 02882.

Flotsam and Jetsam, newsletter of the Massachusetts Marine Educators. Free with membership; annual fee $5. For more information contact: Barbara Passero, Editor, Flotsam and Jetsam, Suffolk University, Department of Biology, Beacon Hill, Boston, MA 02114.

National Geographic Society Magazine and National Geographic World, a publication for young readers, P.O. Box 2330, Washington, DC 20036.

New England Aquarium, Tidepool Information Sheets, a set of eight with pictures and interesting facts about tidepool animals. Available in the Gift Shop or with order form in this packet.

Ranger Rick, publication of the National Wildlife Federation, for young readers, 1412 16th Street N.W., Washington, DC 20036.

Tidepool Times, newsletter of the Nature Center at Odiorne State Park, c/o Sea Grant Marine Advisory Program, Administration Building, University of New Hampshire, Durham, NH 03824. $5, annual subscription.

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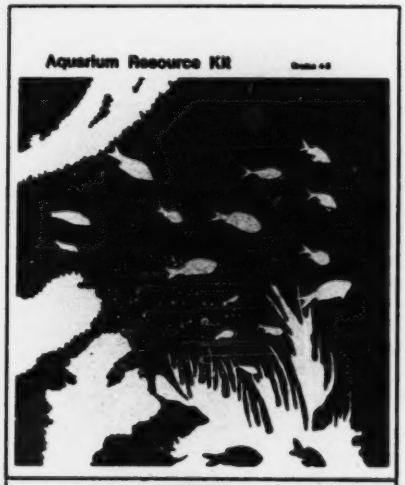

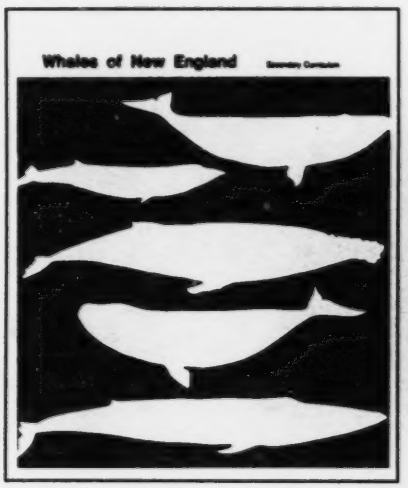

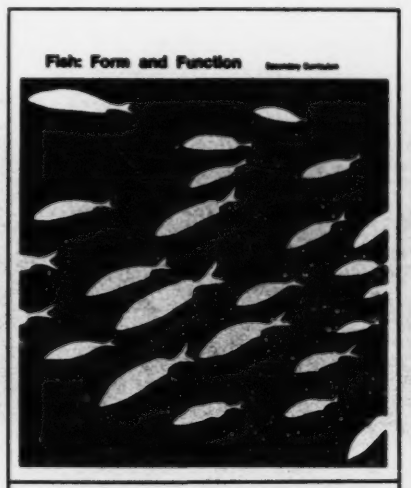

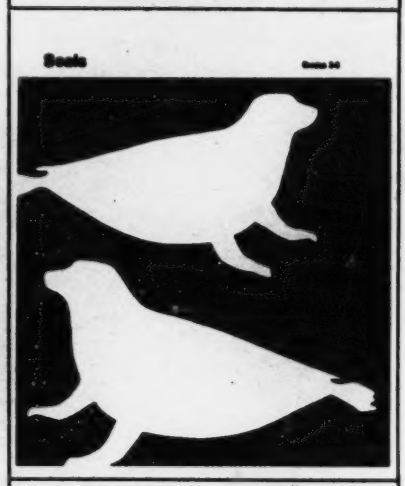

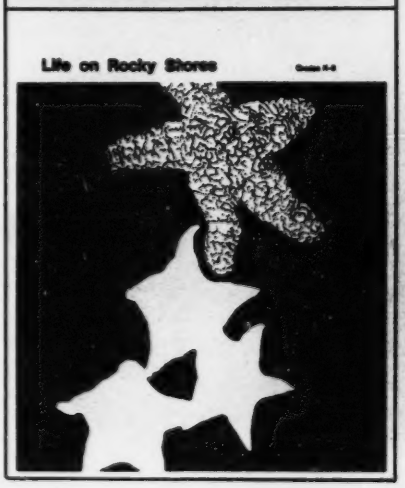

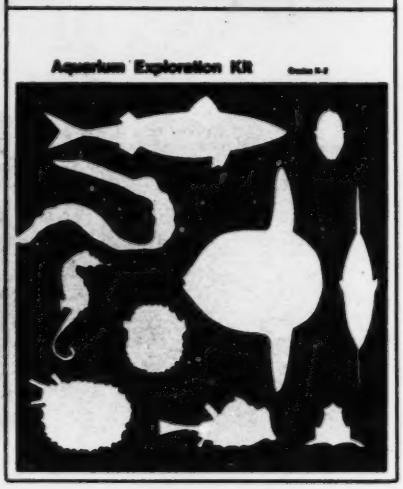

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